

Cuatrecasanthus (Vernonieae, Compositae): A revision of a north-central Andean genus

Harold Robinson¹, Vicki A. Funk¹

¹ Department of Botany, MRC 166, National Museum of Natural History, P.O. Box 37012, Smithsonian Institution, Washington, DC. 20013-7012

Corresponding author: Harold Robinson (robinsoh@si.edu); Vicki A. Funk (funkv@si.edu)

Academic editor: Sandra Knapp | Received 7 December 2011 | Accepted 29 June 2012 | Published 30 July 2012

Citation: Robinson H, Funk VA (2012) *Cuatrecasanthus* (Vernonieae, Compositae): A revision of a north-central Andean genus. *PhytoKeys* 14: 23–41. doi: 10.3897/phytokeys.14.2520

Abstract

Cuatrecasanthus is native to Ecuador and Peru and although several unusual characters define the genus, such as single flowered heads and corolla throat (limb) divided to the base with lobes that are thickened at the margins, the members of the genus were not recognized as especially closely related until relatively recently. All six species are described, including two new to science (*Cuatrecasanthus kingii* H. Rob. & V.A. Funk, **sp. nov.** and *Cuatrecasanthus lanceolatus* H. Rob. & V.A. Funk, **sp. nov.**), and one new combination is recognized (*Cuatrecasanthus giannasii* (Stutts) H. Rob. & V.A. Funk, **comb. nov.**). A key is provided along with images of the types, SEM photographs of the leaf surfaces, a distribution map, and illustrations of the two new species. All species are given a preliminary conservation status of Data Deficient in regard to the IUCN Red List of Threatened Species.

Keywords

Asteraceae, *Critoniopsis*, Ecuador, Neotropics, Peru

Introduction

The Andean genus *Cuatrecasanthus* H. Rob., native to Ecuador and Peru, is one of the most readily distinguished genera in the tribe Vernonieae. The combination of heads with one floret, corollas with the limb divided to the base into five scarcely distorted lobes, lobes with thickened margins, and ten-ribbed achenes is unique in the tribe. Another Andean genus, with similarly deeply cut corolla lobes, *Joseanthus*

H. Rob., differs by its opposite leaves and many florets in each head. Although the distinctions of *Cuatrecasanthus* are clear, it has been subject to problems at the species level that have not been entirely resolved until the present effort to treat the genus for the Flora of Ecuador.

Given the distinctive characters of the genus, it is surprising that the first few species that were described were not recognized as relatives. The first member the group to be described was *Eremanthus jelskii* Hieron. from Peru. When *Vernonia flexipappa* was described by Gleason (1925), the relationship to *E. jelskii* was not recognized. Yet again, *Vernonia giannasii* Stutts (1980) was described without mention of the previously described relatives. It was Robinson and Kahn (1985), at the time of the description of *Vernonia sandemannii* (1985), who first recognized the relationship of the new species to the Hieronymus and Gleason species. At the time of the description of the genus *Cuatrecasanthus* (Robinson 1989) the three species were placed together, with *Vernonia giannasii* being treated as a synonym of *Cuatrecasanthus flexipappus*. The most recent studies have shown some errors in the 1989 treatment, with *V. giannasii* proving to be a distinct species and two additional species needing description. The genus thought to contain three species now proves to contain six with all the additions being based on material from Ecuador.

Although material of *Vernonia flexipappa* was collected by Keeley in 1983, it was not reported in the DNA study of Keeley et al. (2007). Nevertheless, a position for *Cuatrecasanthus* in the subtribe Piptocarphinae near *Critoniopsis* Sch. Bip. is hypothesized on the basis of the woody habit, branching trichomes on the abaxial surface of leaves, and blunt-tipped sweeping hairs on the styles.

Systematics

***Cuatrecasanthus* H. Rob., Revista Acad. Colomb. Ci. Exact. 17(65): 209 (1989).**
<http://species-id.net/wiki/Cuatrecasanthus>

Type species: *Vernonia sandemanii* H. Rob. & B. Kahn (=*Cuatrecasanthus sandemanii* (H. Rob. & B. Kahn) H. Rob.)

Description. Erect branching shrubs, scrambling shrubs or trees (rarely vines) to 3.5 m tall; stems terete, striate, minutely pilose (pilosulous) with evanescent simple hairs or thinly tomentose; pith solid. Leaves alternate, petiolate; blades elliptical or lanceolate, base narrowly cuneate to attenuate, subchartaceous, margins entire to remotely subserrulate, narrowly recurved, apex usually sharply acuminate, adaxial surfaces pilosulous with simple non-septate, thick-walled trichomes, with numerous glandular dots, abaxial surfaces covered with thin whitish tomentum of prostrate myceliiform minutely branching trichomes; secondary veins 4–9 on each side of midvein, ascending basally at 45–60° angles. Inflorescence terminal on leafy stems, rounded corymbiform, branching alternate, with large foliaceous bracts only at lower primary nodes.

Heads clustered and sessile in glomerules at ends of short branchlets (Figs 7C, 9B), individual heads cylindrical; *involucral bracts* ca. 15 in 5–6 gradate series (Figs 7D, 9C), inner bracts easily deciduous, outer bracts persistent; *receptacle* glabrous. *Florets* one per head; *corollas* lavender, outside minutely gland-dotted, distally sometimes pilosulous, basal tube narrow, ca. 2.5–4.0 mm long, throat lacking, lobes 5, linear, separated to base of limb, with somewhat thickened margins, not or scarcely distorted on drying (Figs 7E, 9D); *anther* thecae purple, with short papillose-fimbriate basal appendage, apical appendage ovate-oblong, ca. 0.5 mm long, glabrous; *style* base with stopper-shaped node, with thick-walled cells, sweeping hairs non-septate, obtuse to short-acute. *Achenes* prismatic, 10-costate (Figs 7G, 9F), surface sometimes fleshy, with numerous glandular dots, with few or no eglandular trichomes, with minute short-oblong raphids, base with broad annuliform carpopodium; *pappus* straw-colored, of 45–65 crowded rather persistent capillary bristles, about as long as corolla, barbellate, mostly some somewhat broadened and flattened distally, a few outer shorter bristles rather indistinct. *Pollen* ca. 40–45 μm in diam., spinulose, sublophate, tricolporate, with continuous perforated tectum between colpi.

In addition to the diagnostic generic characteristics are features of special interest such as the marginal teeth of the leaves that are incurved and appressed against the abaxial surface in all but one species (*C. lanceolatus*; Fig. 1A–B) and the finely branching myceliiform hairs on the abaxial surface of the leaves in all the species (Fig. 1C). In addition, there is variation on the leaf surfaces. The surfaces of the leaves have veins that can be exsculptate (above the surface), insculpate (below the surface), or even with the adaxial leaf surface (Figs 2–4). All but one of the species have veins on the adaxial surface that are even with the surface or slightly insculpate; one species has veins that are deeply insculpate (*C. giannasii*) and all six species have veins that are exsculptate on the abaxial surface. The style branches are reported on one herbarium label as pale pink almost white; there are no additional data on the color of the styles.

The genus occurs in Ecuador and Peru. The six known species can be distinguished using the following key:

- 1 Leaf margins with numerous obvious antrorse teeth not strongly incurved against abaxial surface (may vary in prominence); leaf tips narrowly acute, not abruptly short-acuminate..... 5. *C. lanceolatus*
- Leaf margins entire or with obscure inturned teeth; leaf tips usually abruptly short-acuminate..... 2
- 2 Inflorescence with loose clusters of heads, distinctly exceeding the upper leaves 3
- Inflorescence with dense clusters of heads, not or scarcely exceeding the upper leaves, with interspersed foliiform bracts 4
- 3 Leaf blade broadly elliptical or ovate-elliptical; adaxial surface hispidulous with midvein prominently exsculptate and otherwise plane..... 4. *C. kingii*

- Leaf blade lanceolate-elliptical; adaxial surface sparsely covered with appressed minute trichomes with at least the midvein insculpate.....
..... **6. *C. sandemanii***
- 4 Adaxial surface of leaf with all veins distinctly insculpate; adaxial surface with few short trichomes, veins and trichomes all whitish; distal leaf margins with incurved teeth pressed against abaxial leaf surface; tips of pappus bristles distinctly broadened..... **2. *C. giannasii***
- Adaxial surface of leaf with major veins not obviously insculpate, secondary and tertiary veins insculpate; adaxial surface with many prominent stiff trichomes, midvein and trichomes dark brown or yellow; leaf margins with few inturned teeth; tips of pappus bristles not or scarcely broadened..... **5**
- 5 Abaxial surface of midvein of leaf with dense antrorse pubescence mostly on sides; abaxial surface of lamina covered with mostly appressed, stiff, usually brownish trichomes **1. *C. flexipappus***
- Abaxial surface of midvein of leaf densely hirsute with spreading hairs; abaxial surface of lamina with erect yellowish trichomes **3. *C. jelskii***

1. *Cuatrecasanthus flexipappus* (Gleason) H. Rob., Revista Colomb. Ci. Exact. 17 (65): 210. 1989.

http://species-id.net/wiki/Cuatrecasanthus_flexipappus

Figs 5A, 10

Type: Based on *Vernonia flexipappa* Gleason

Vernonia flexipappa Gleason, Bull. Torrey Bot. Club 52(5): 186. 1925.

Type: Ecuador. Loja: sin. loc., E. André 2250 (holotype: NY, image US!; isotype: K).

Description. Shrubs or small trees, 1.0–3.0 m tall; stems densely pilose with dark brown trichomes, becoming glabrous with age. Leaves with petioles 0.5–1.2 cm long; blades narrowly to broadly elliptical, mostly 3–9 cm long, 1–3 cm wide, narrowly acuminate at base and apex, margin narrowly but strongly recurved, without evident teeth or with in-turned teeth, adaxial surface dark green, glabrous or with minute appressed pubescence, secondary and tertiary veins insculpate, abaxial surface pale greenish covered with mostly appressed, stiff, brownish trichomes (rarely straw colored) intermixed with less evident whitish prostrate myceliiform branching trichomes, midvein with dense antrorse pubescence mostly on sides; secondary veins ca. 5 pairs, spreading from midvein at ca. 45° angles, strongly curved. Inflorescence scarcely exceeding vegetative leaves; branches densely pilosulous or hirtellous. Heads sessile in clusters of 3–7, ca. 10–11 mm tall × 2 mm wide; involucres cylindrical to fusiform; bracts mostly deciduous, ca. 15 in ca. 5 series, 1.0–5.5 mm long, ca. 1.2 mm wide, apices short-acute, ovate to narrowly elliptical, yellowish or with reddish median stripe, puberulous to nearly glabrous outside. Florets with corollas white to bluish white or lavender, ca. 5.5 mm long, with glandular dots on basal tube and tips of lobes, few small trichomes

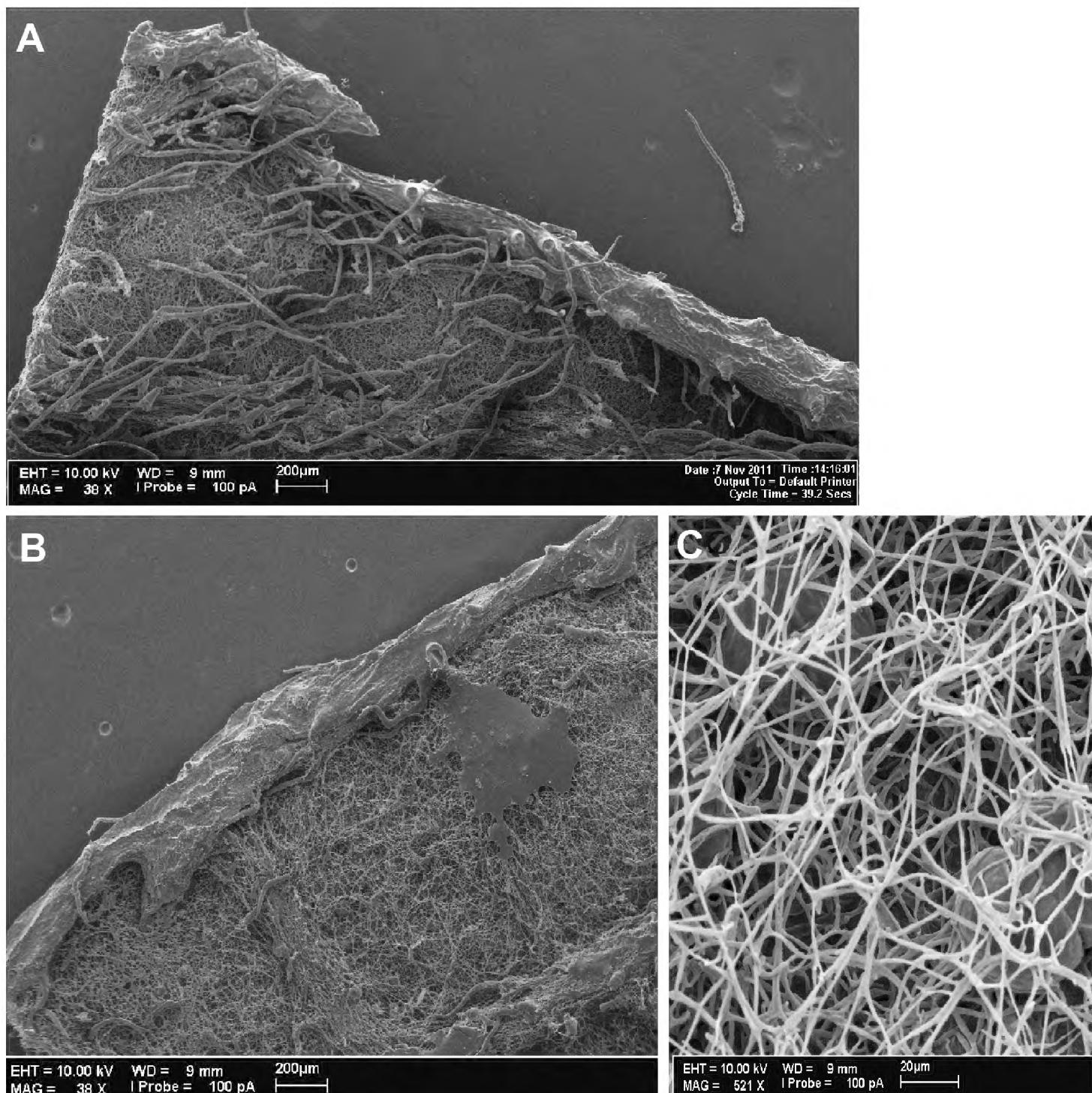


Figure 1. *Cuatrecasanthus* leaves: **A** *C. lanceolatus* showing projecting marginal tooth **B** *C. kingii* showing incurved tooth **C** Myceliform hairs on abaxial surface of leaf of *C. giannasii*.

on lobe tips, tubes ca. 2 mm long, lobes ca. 4 mm long, with some non-glandular trichomes; *anther thecae* ca. 2 mm long. *Achenes* 2.0–2.5 mm long; *pappus* white, of ca. 50 bristles mostly ca. 6 mm long, not or scarcely broadened toward tips. *Pollen* grains 37–47 μm in diam.

Additional specimens examined. Ecuador. Loja: along road between Loja and Zamora, ca. km 11 [03°59'0"S, 79°08'16"W, estimated], 2600 m, 2 August 1978, Zarucchi & Andrade 2304 (US); Carretera Loja–Zamora, km 13, 2500 m [03°59'00"S, 79°07'00"W, estimated], 16 August 1983, Jaramillo & Winnerskjold 5812 (AAU); Loja–Zamora road, ca. km 15, 03°58'S, 79°08'W, 2400–2700 m, 22–23 April 1984, Madsen 74081 (AAU, QCA, US); In the páramo of “El Tiro,” located at northern terminus of Podocarpus National Park, 500 m from the Loja–Zamora highway, 03°59'S, 79°08'W, 2940–2970 m, 14 April 1992, Keating 143 (US); In the

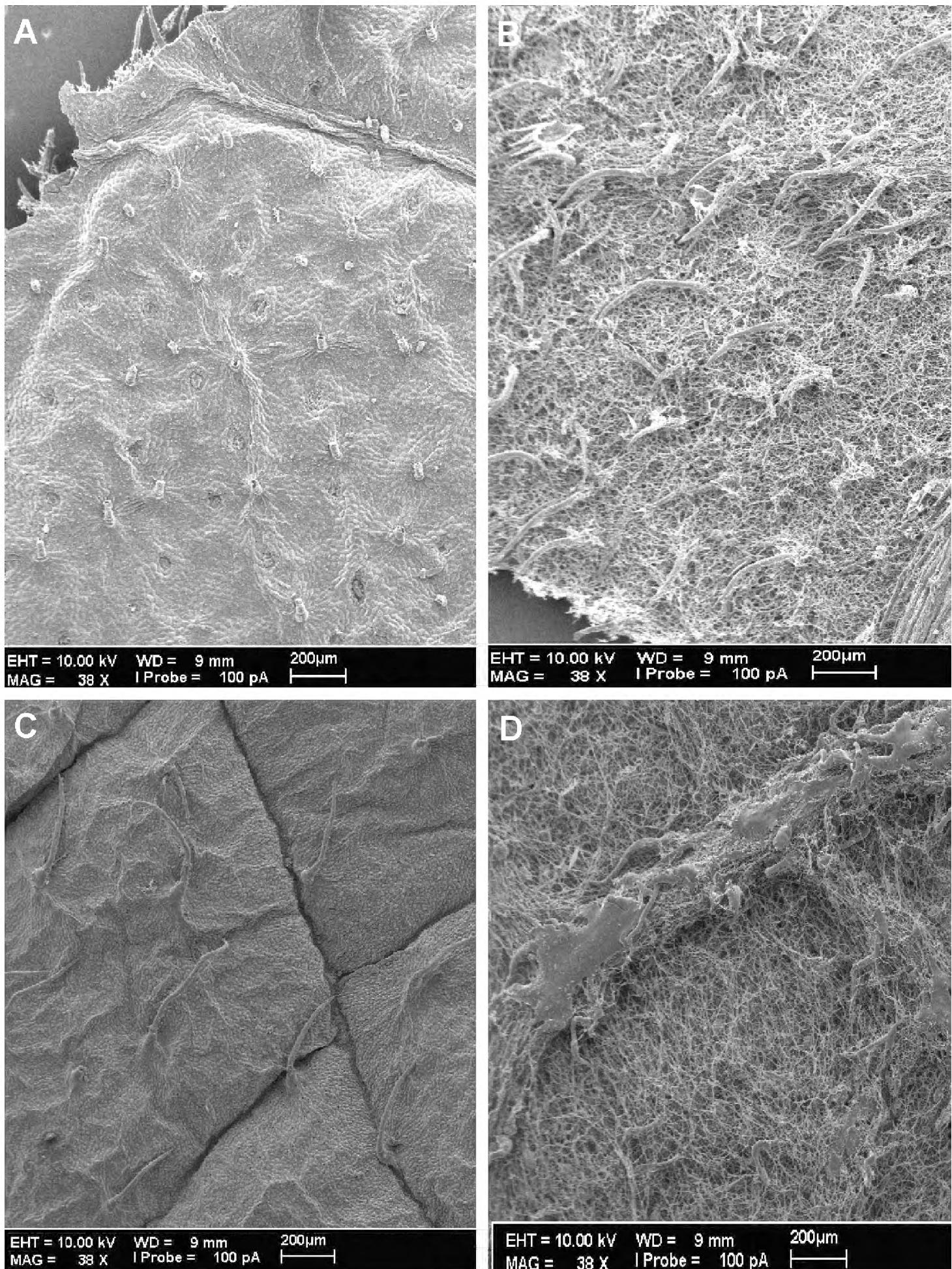


Figure 2. *Cuatrecasanthus* leaf surfaces: **A–B** *C. flexipappus*. **A** Adaxial surface **B** Abaxial surface **C–D** *C. giannasii* **C** Adaxial surface, showing deeply insculpate veins **D** Abaxial surface.

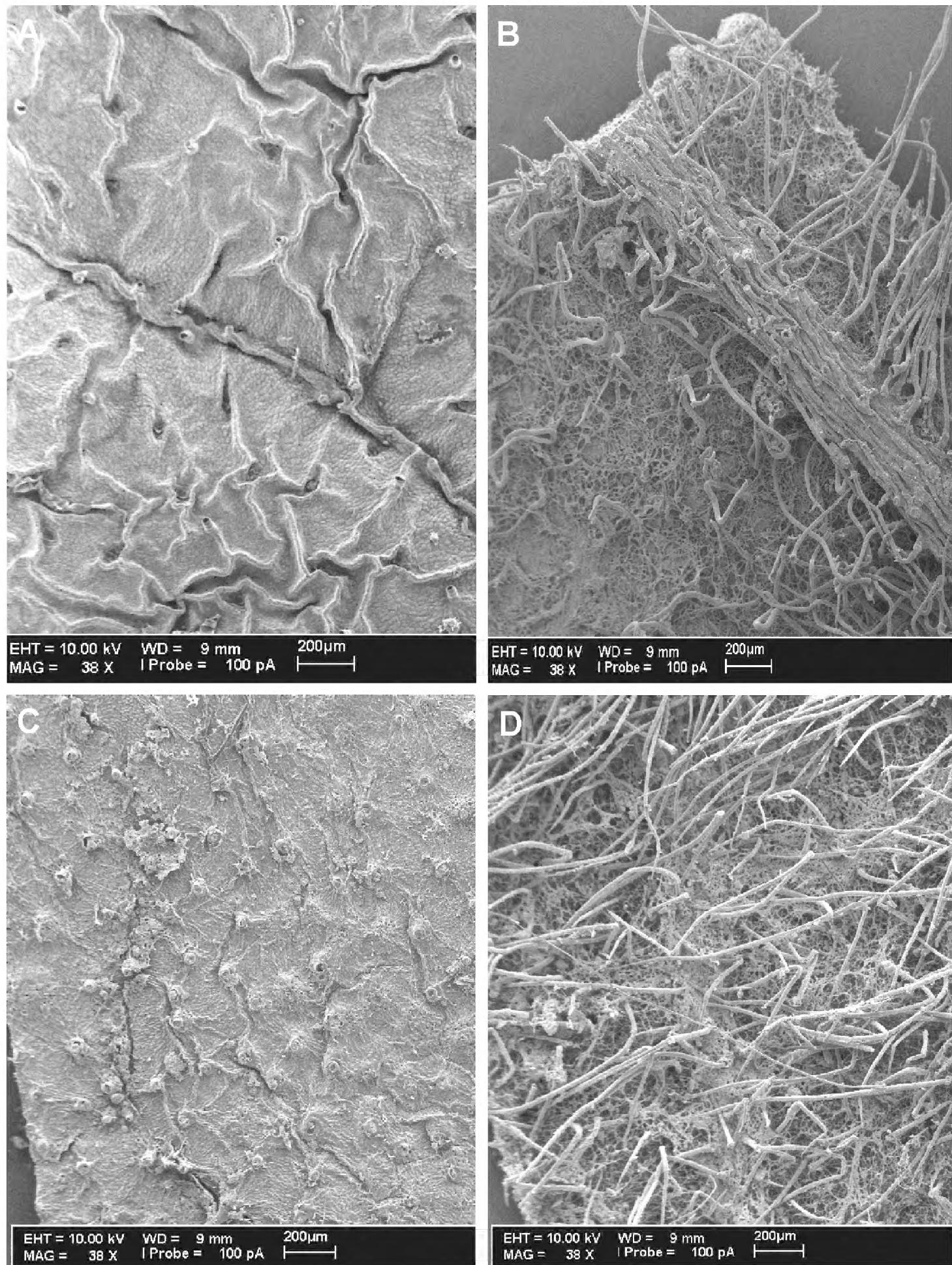


Figure 3. *Cuatrecasanthus* leaf surfaces: **A–B** *C. jelskii*. **A** Adaxial surface **B** Abaxial surface **C–D** *C. kingii*. showing veins even with surface **D** Abaxial surface.

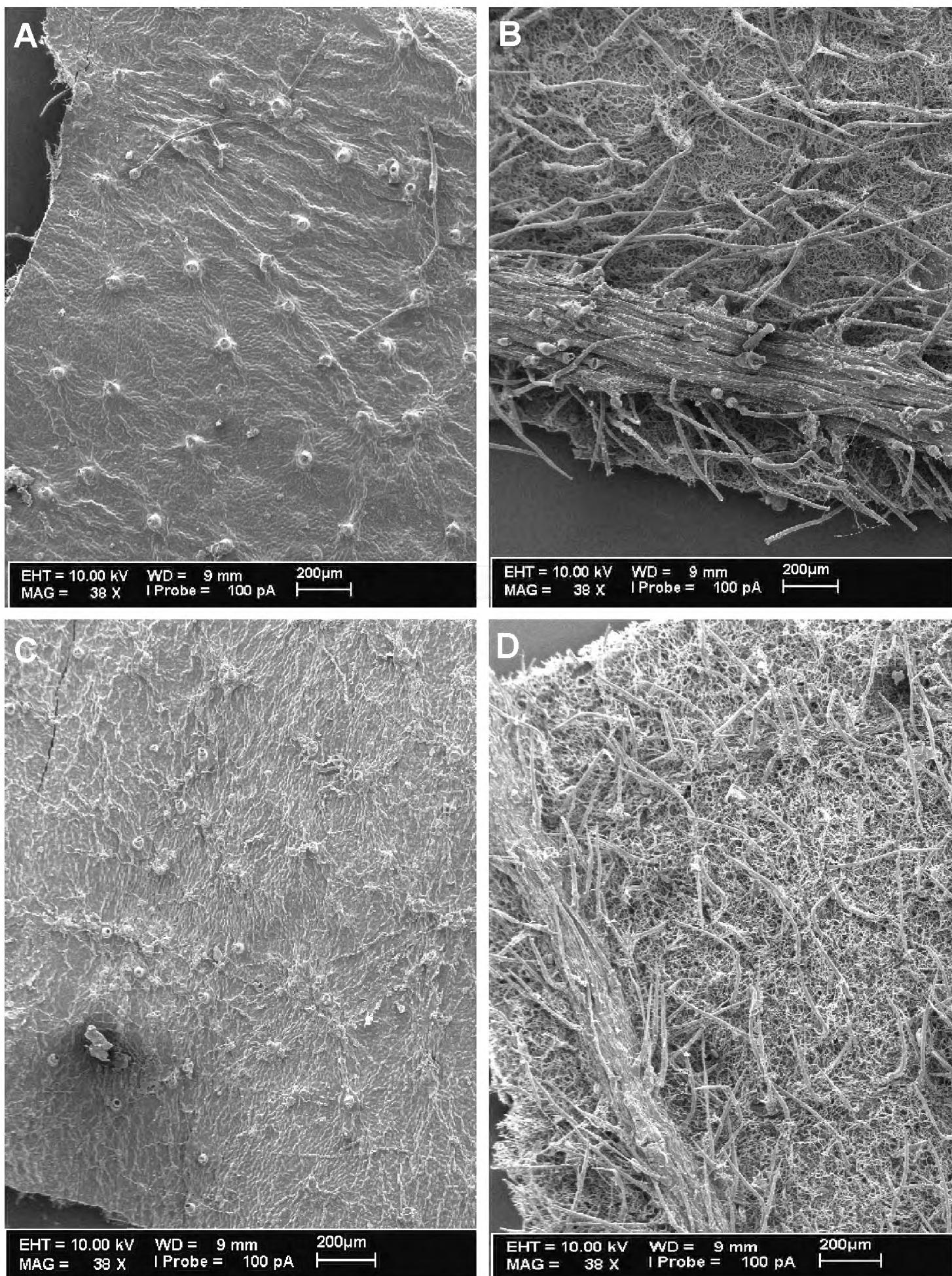


Figure 4. *Cuatrecasanthus* leaf surfaces: **A–B** *C. lanceolatus*. **A** Adaxial surface **B** Abaxial surface **C–D** *C. sandemanii* **C** Adaxial surface **D** Abaxial surface.

páramo and shrub páramo above the Refugio de Cajanuma (Centro de Información), Podocarpus National Park, 04°07'00"S, 79°09'30"W, 2800 m, 31 July 1993, Keating 409 (US). **Zamora-Chinchipe:** 14.8 km from transit control out of Loja on road



Figure 5. Photographs of *Cuatrecasanthus* types: **A** *C. flexipappus*, holotype (NY) **B** *C. giannasii*, holotype (S).

to Zamora [03°59'10"S, 79°08'02"W, estimated], 2500 m, 8 July 1983, Keeley & Keeley 4104, 4105, 4106, 4107, 4108, 4109, 4110, 4111, 4115 (K, US); Keeley & Keeley 4112, 4114 (US); Zamora, carretera Loja–Zamora, Estación Científica San Francisco, sendero hacia las antenas. Colecciones cerca del Francisco 4, en Transecto 2, 03°58'S, 79°04'W, 3000 m, 29 April 2000; Freire Fierro 3121 (MO, US).

Peru. **Cajamarca:** Prov. Jaen; E slope of Paso de Huascarai, head of Quebrada Granadillas, 15 km SE of Huancabamba, 05°22'S, 79°20'W, 3000 m, 10 June 1947, Fosberg 27852 (US). **Piura:** Prov. Huancabamba; Los Llanos to Chorro Blanco (Sapalache – Chiguelas), 2650 m, 5°08.2'S, 79°24.6'W, 19 Oct. 2001, Sagastegui, Dillon, Leiva, & Zapata 16781 (F, HUT).

Habitat. Roadside, burned over cloud forest on steep south-facing slope; shrub páramo at 2400–3000 m in elevation.

The species is the most commonly collected member of the genus but apparently is sympatric with both *C. kingii* and *C. lanceolatus* in the area near the border between Loja and Zamora/Chinchipe. The species is very closely related to the northern Peruvian *C. jelskii* (Hieron.) H. Rob. The latter differs most obviously by the densely hirsute abaxial surface of the midvein of the leaves and erect rather than appressed trichomes of the abaxial blade surface. The adaxial leaf surface of the latter also has less strongly insculpate veins.

Preliminary conservation status. Data Deficient

2. *Cuatrecasanthus giannasii* (Stutts) H. Rob. & V.A. Funk, comb. nov.

urn:lsid:ipni.org:names:77121072-1

http://species-id.net/wiki/Cuatrecasanthus_giannasii

Figs 5B, 10

Type: Based on *Vernonia giannasii* Stutts

Vernonia giannasii Stutts, Brittonia 32(2): 162 (1980).

Type. Ecuador. Morona-Santiago [formerly Santiago-Zamora]: Camino Cuenca, General Plaza (Limon), 39–41, [02°59'S, 78°41'W, estimated], 2300 m, 19 September 1967, B. Sparre 18721 (holotype: S!).

Description. *Vines or scrambling shrubs*; stems flexuous, densely pilose with long, mostly single-celled trichomes. *Leaves* with petioles 0.4–0.7 cm long; *blades* subchartaceous, elliptical, mostly 3.5–8.5 cm long, 1.0–2.5 cm wide, acuminate at base, acute to short-acuminate at apex, margins appearing entire, narrowly recurved, with inflexed teeth distally, adaxial surface, dark green, bullulate, sparsely short-scabridulous, secondary and tertiary veins insculpate, abaxial surface pale green with thin white cover of myceliiform branched trichomes, minutely pilosulous with pale trichomes on veins, without dark trichomes, all veins and veinlets exsculptate; *secondary veins* ca. 5 or 6 on each side of midvein, spreading at base at 45–50° angles, curved and more strongly ascending near margins. *Inflorescence* terminal and from axils of uppermost leaves, not or scarcely exceeding the leaves, rounded corymbiform; branches short, puberulous. *Heads* sessile with up to 9 clustered in dense glomerules, 8–10 mm tall, ca. 2 mm wide; *involucre* cylindrical or narrowed distally and fusiform, bracts ca. 16 in ca. 5 series, short-ovate to oblong elliptical, 2.0–5.5 mm long, 1.0–1.5 mm wide, apices short-acute, slightly darkened distally, sometimes with reddish median line, glabrous outside. *Florets* with corollas pale lavender, ca. 6.5 mm long, with glandular dots on basal tube and tips of lobes, tubes ca. 2.5 mm long, lobes ca. 4 mm long; *anther thecae* ca. 2.5 mm long. *Achenes* ca. 2.5 mm long; *pappus* white, of ca. 40 capillary bristles ca. 6.5 mm long, distinctly broadened toward tips. *Pollen* grains ca. 40 µm in diam.

Additional specimens examined. Ecuador. **Loja:** Loja to Zamora, 1876, André K1152 (F, NY). **Morona-Santiago** [formerly Santiago-Zamora]: Eastern slope of the cordillera, Valley of the ríos Negro and Chupianza (on trail from Sevilla de Oro to Mendez, Tambo Consuelo to Tambo Cerro Negro, [01°49'S, 78°23'W, estimated], 2400–3000 m, 17 December 1944, Camp E-1619 (NY, US).

The species is known only from Morona-Santiago and Loja, Ecuador, between 2300 and 3200 m in elevation (Fig. 10).

Camp describes the habit as a vine and this character would easily distinguish the species, but the type specimen has no information on the habit and it appears to be a sturdier plant. Only new collections that document the habit will resolve this issue.

Preliminary conservation status. Data Deficient

3. *Cuatrecasanthus jelski* (Hieron.) H. Rob., Revista Colomb. Ci. Exact. 17 (65): 210 (1989).

http://species-id.net/wiki/Cuatrecasanthus_jelski

Figs 6A, 10

Type: Based on *Eremanthus jelskii* Hieron.

Eremanthus jelskii Hieron., Bot. Jahrb. Syst. 36(5): 462 (1905), non *Vernonia jelskii* Hieron., Bot. Jahrb. Syst. 36(5): 459 (1905).

Type: Peru. Cajamarca: Prope Shanyn (Quebrada Lejia) [probably not far from Tambillo] [05°40'50"S, 79°16'7"W, Cerro Tambillo, estimated], *Jelski* 776 (holotype: B, destroyed, photos F, US! [F neg. 14657]; lectotype, designated here: US!).

Vernonia shannensis MacLeish, Syst. Bot. 9 (2): 135 (1984), nom. nov. for *Eremanthus jelskii*.

Type: Based on *Eremanthus jelskii* Hieron.

Description. Shrubs or small trees, 1.0–3.0 m tall; stems densely velutinous (short velvety) with dark brown trichomes. Leaves with petioles 0.3–0.5 cm long; blades narrowly to broadly elliptical, mostly 3–10 cm long, 1–2.5 cm wide, narrowly acuminate at base and apex, margin narrowly but strongly recurved, with few inturned teeth distally, adaxial surface dark green, glabrous or with appressed puberulence, secondary and tertiary veins insculpate, abaxial surface pale green covered with erect, stiff, yellowish trichomes intermixed with less evident whitish prostrate myceliiform branching trichomes, midvein with dense spreading pubescence; secondary veins ca. 5–6 pairs, spreading from midvein at 45–55° angles, strongly arched. Inflorescence scarcely exceeding vegetative leaves, with intermixed foliiform bracteoles; branches densely pilosulous or hirtellous. Heads sessile in clusters of 3–7 within larger glomerules, 10–11 mm tall × 1.5–2.0 mm wide; involucres cylindrical to fusiform; bracts ca. 9–12 in ca. 4 series, 1–5 mm long, ca. 1.2 mm wide, apices short-acute, ovate to narrowly elliptical, yellowish darkened tip, outer bracts puberulous, inner bracts glabrous outside. Florets with corollas violet, ca. 6 mm long, with glandular dots on tube and tips of lobes, tubes ca. 2.5 mm long, lobes ca. 3.5 mm long; anther thecae deep purple, ca. 3 mm long. Achenes 2.0–2.5 mm long; pappus white, of 32–ca. 50 bristles mostly ca. 6 mm long, not or scarcely broadened toward tips. Pollen grains 37–47 µm in diam.

Additional specimen examined. Peru. **Cajamarca:** Prov. Cutervo; La Pucarilla, entre Sócota y San Andrés [6°16'S, 78°42'W, estimated based on elevation], 2500–2650 m, 24 June 1988, *Sánchez Vega* 4868 (CPUN, F, US); 2450 m, 14 November 1986, *Mostacero, Leiva, Mejía, Peláez, & Guevara* 1631 (F, HUT); 2 Nov 1991, *Sánchez Vega, Sagastegui & Guevara* 5990 (CPUN); Prov. San Ignacio; Cordillera del Condor, Munic. Dist. Huarango, Nuevo Mundo, Caserío Rey del Oriente, arriba, Caseríos Gosén [5°19'S, 78°43'W, estimated for CG but elevation too low] y Pisaguas, 1800 m, 26 July 1997, *Rodríguez & Campos* 1816 (MO, US). **Lambayeque:** Prov. Ferranafe; Paso Upaypecc, Cañaris [6°03'S, 79°16'W, estimated for Cañaris], 3000 m, 25 June 1989, *Llatas Quiroz* 2499 (F).



Figure 6. Photographs of *Cuatrecasanthus* types: **A** *C. jelskii*, lectotype (US) **B** *C. kingii*, holotype (US).

Habitat. Rodríguez & Campos 1816 was described as having been collected in primary forest. The range in elevation that has been reported is 1800–3000 m (Fig. 10).

This species was the first member of the genus to be described. At the time of its description, a comparison was made to Brazilian species of *Eremanthus*, members of the comparatively distantly related subtribe Lychnophorinae. Herbaria that might hold Jelski collections from Peru and therefore might have additional isolectotypes (according to Chaudhri et al. 1972) are F, KRA, NY and W.

Preliminary conservation status. Data Deficient

4. *Cuatrecasanthus kingii* H. Rob. & V.A. Funk, sp. nov.

urn:lsid:ipni.org:names:77121073-1

http://species-id.net/wiki/Cuatrecasanthus_kingii

Figs 6B, 7, 10

Type. Ecuador. Zamora–Chinchipe: 17 km E of Loja on the road to Zamora [03°58'53"S, 79°06'31"W, estimated], 7800 ft [2370 m], 31 January 1979, King & Almeda 7928 (holotype: US!; isotype: CAS).

Description. Shrubs to 1 m tall, bases erect or decumbent to rhizome; stems densely lanulate with tawny mostly single-celled trichomes. Leaves with petioles 0.8–

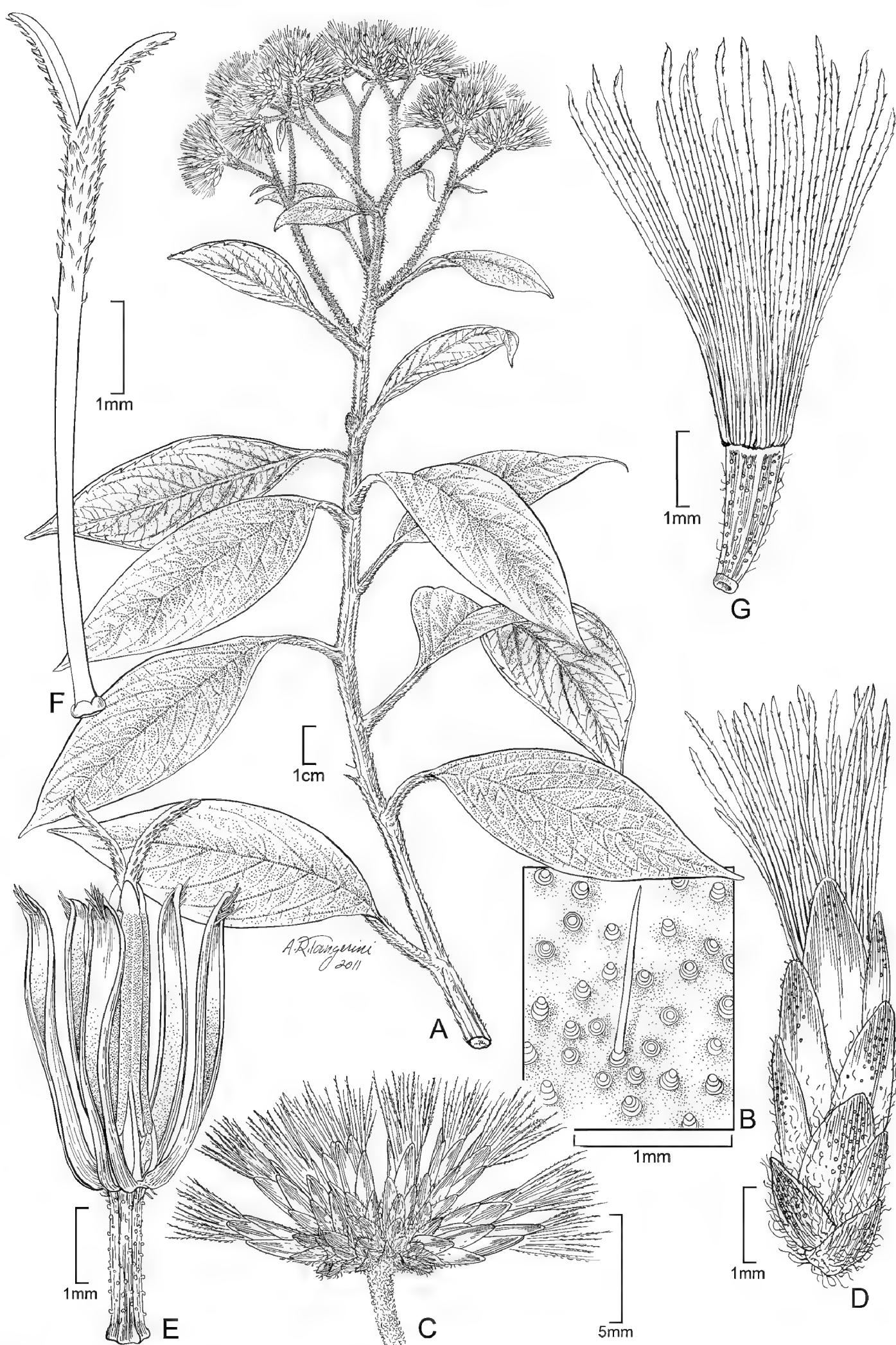


Figure 7. *Cuatrecasanthus kingii*: **A** Habit **B** Detail of adaxial surface of leaf **C** Cluster of heads **D** Single head containing one floret **E** Floret showing corolla lobes divided to base of limb, with thickened margins **F** Style **G** Achene with 8–10 ribs.

2.0 cm long; *blades* ovate to elliptical, mostly 3.5–8.5 cm long, 2–3 cm wide; base acuminate, apex short-acuminate, margins appearing entire, narrowly recurved, with incurved teeth distally, adaxial surface dark, epidermal cells often paler in area along veins, surface plane or with slightly insculpate veins, densely hispidulous with stiff trichome bases, abaxial surface densely lanulate to sericeous with tawny trichomes, at surface with dense white cover of myceliumiform stellate trichomes; *secondary veins* ca. 5 or 6 on each side of midvein, spreading at base at 45–50° angles, curved and more strongly ascending near margins. *Inflorescence* distinctly exceeding reduced distal leaves, with few long ascending branches; *branches* tomentellous with dark hairs. *Heads* sessile and with up to 12 clustered in dense ultimate glomerules, up to 10 mm tall, ca. 2 mm wide; *involucre* cylindrical or narrowed distally and fusiform, bracts brown, ca. 16 in ca. 5 series, short-ovate to oblong elliptical, 2.0–5.5 mm long, 1.0–1.5 mm wide, apices short-acute, slightly darkened distally, sometimes with reddish median line, scarios, glabrous outside. *Florets* with corollas possibly pale lavender, ca. 6.5 mm long, with numerous glandular dots on basal tube and few on tips of lobes, tips of lobes paucipilosulous, tube ca. 2.5 mm long, lobes ca. 4 mm long; *anther thecae* ca. 2.5 mm long. *Achenes* ca. 2.5 mm long; *pappus* white, of ca. 50 capillary bristles ca. 6.5 mm long, not or scarcely broadened toward tips. *Pollen* grains 35–42 µm in diam.

Additional specimen examined. Ecuador. Loja: 10 km E of Loja on road to Zamora [03°59'07"S, 79°08'16"W, estimated], 2500 m, 31 January 1979, King & Almeda 7920 (CAS, US).

Habitat. Secondary vegetation bordering steep wooded slopes; wet windswept forested ridge interspersed with pastures at elevations of 2370–2500 m (Fig. 10).

The species has the most broadly elliptical leaf blades of any member of the genus. The most distinctive feature, however, is the mostly flat and hispidulous adaxial surface of the leaves. The distribution is restricted to the area near the pass between the Ecuadorian provinces of Loja and Zamora-Chinchipe (Fig. 10).

Preliminary conservation status. Data Deficient

5. *Cuatrecasanthus lanceolatus* H. Rob. & V.A. Funk, sp. nov.

urn:lsid:ipni.org:names:77121074-1

http://species-id.net/wiki/Cuatrecasanthus_lanceolatus

Figs 8A, 9, 10

Type. Ecuador. Zamora-Chinchipe: Loja–Zamora, km 20.6, 03°57'S, 79°05'W, 2650 m, 9 August 1997, G.P.Lewis 3424 (holotype: US!; isotypes: AAU!, GB, K, LOJA, MO, QCA, QCNE).

Description. Shrubs to small trees up to 2 m high; stems flexuous above, hexagonal, densely pilose with brownish trichomes. Leaves with petioles mostly 0.5–1.5 cm long; blades lanceolate, broadest at basal 1/3, 4.0–9.5 cm long, 1–3 cm wide, apex distally narrowly acute, not acuminate, margins not or scarcely recurved distally, with marginal teeth projecting upward or outward (may vary in intensity), not inward, adaxial surface

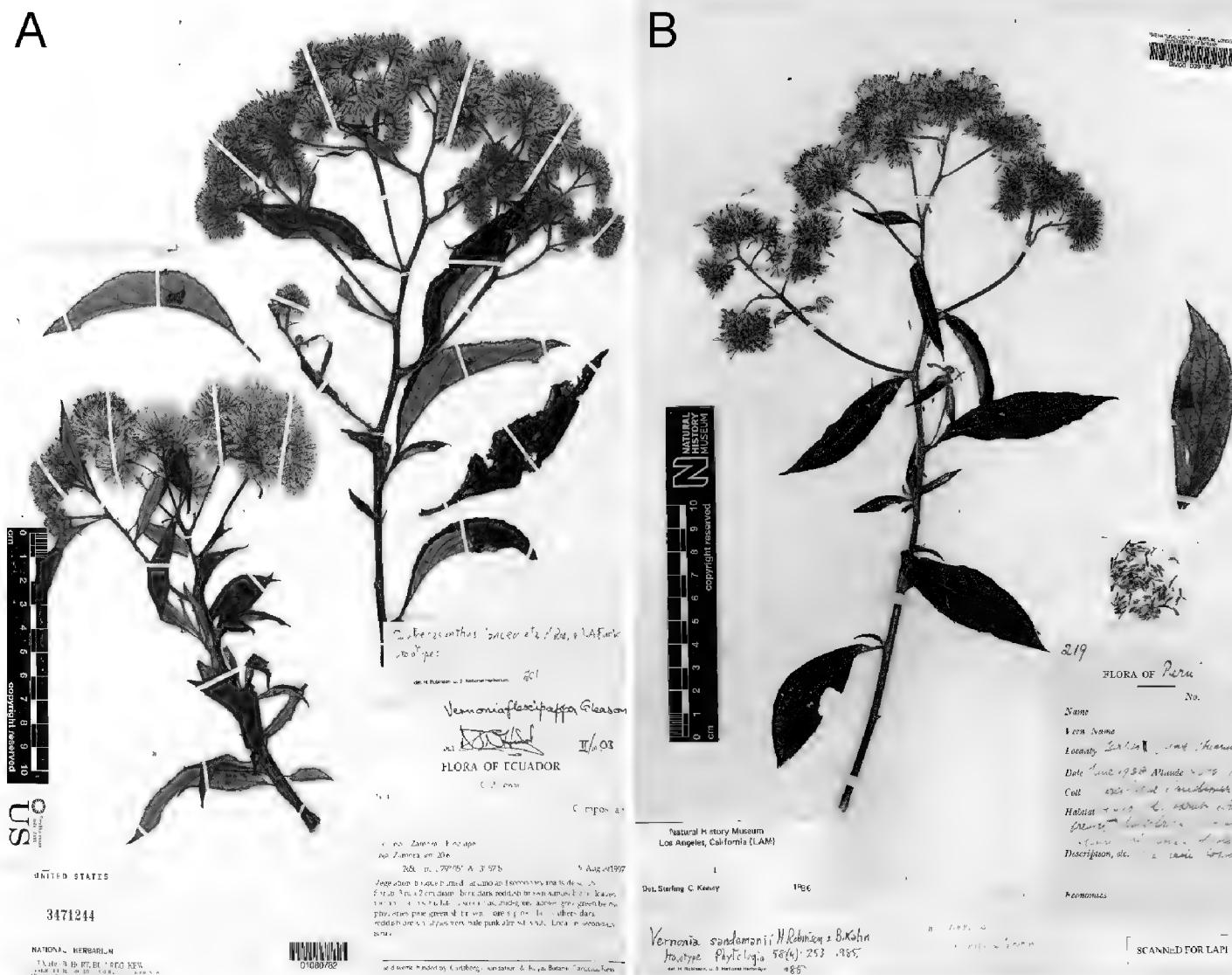


Figure 8. Photographs of *Cuatrecasanthus* types: **A** *C. lanceolatus*, holotype (US) **B** *C. sandemanii*, holotype (BM).

dark green, lamina dotted with gland-like persistent or aborted stumps of small scaber, with weakly insculpate veins, abaxial surface gray-green, tawny-pilose, sometimes contorted, denser on veins, with thin grayish prostrate myceliiform branching trichomes; *secondary veins* in 4–5 pairs, strongly ascending. *Inflorescence* distinctly exceeding the reduced distal leaves, main axis and branches mostly deflected at nodes, rounded corymbiform; *branches* tomentellous. *Heads* sessile in clusters of 2–6 congested in larger dense glomerules, 10–11 mm high × 2 mm wide; *involucres* cylindrical or fusiform, ca. 16 in ca. 5 series, 1.0–4.5 mm long, ca. 1.2 mm wide, short-acute, greenish brown, darkened at tips or along midvein distally, glabrous. *Florets* with corollas pink-lilac, ca. 6 mm long, with numerous glandular dots on basal tubes, with a few short hairs at apices of tubes, tubes ca. 2 mm long, lobes ca. 4 mm long; *anther thecae* dark reddish brown, ca. 2.5 mm long. *Achenes* ca. 2 mm long; *pappus* white, of ca. 45 capillary bristles ca. 6.5 mm long, not or scarcely broadened at tips. *Pollen* grains ca. 35 µm in diam.

Additional specimens examined. Ecuador. Loja: Road to Zamora from Loja, km 12–14, near top of pass, [03°59'6"S, 79°08'23"W, estimated], 2800 m, 28 September 1961, Dodson & Thien 781 (US-2!).

Habitat. Local in secondary scrub at 2650–2800 m in elevation (Fig. 10).

Preliminary conservation status. Data Deficient



Figure 9. *Cuatcasanthus lanceolatus*: **A** Habit **B** Cluster of heads **C** Single head containing one floret **D** Floret showing corolla lobes divided to base of limb, with thickened margins and apical pubescence **E** Style **F** Achene with 8–10 ribs.

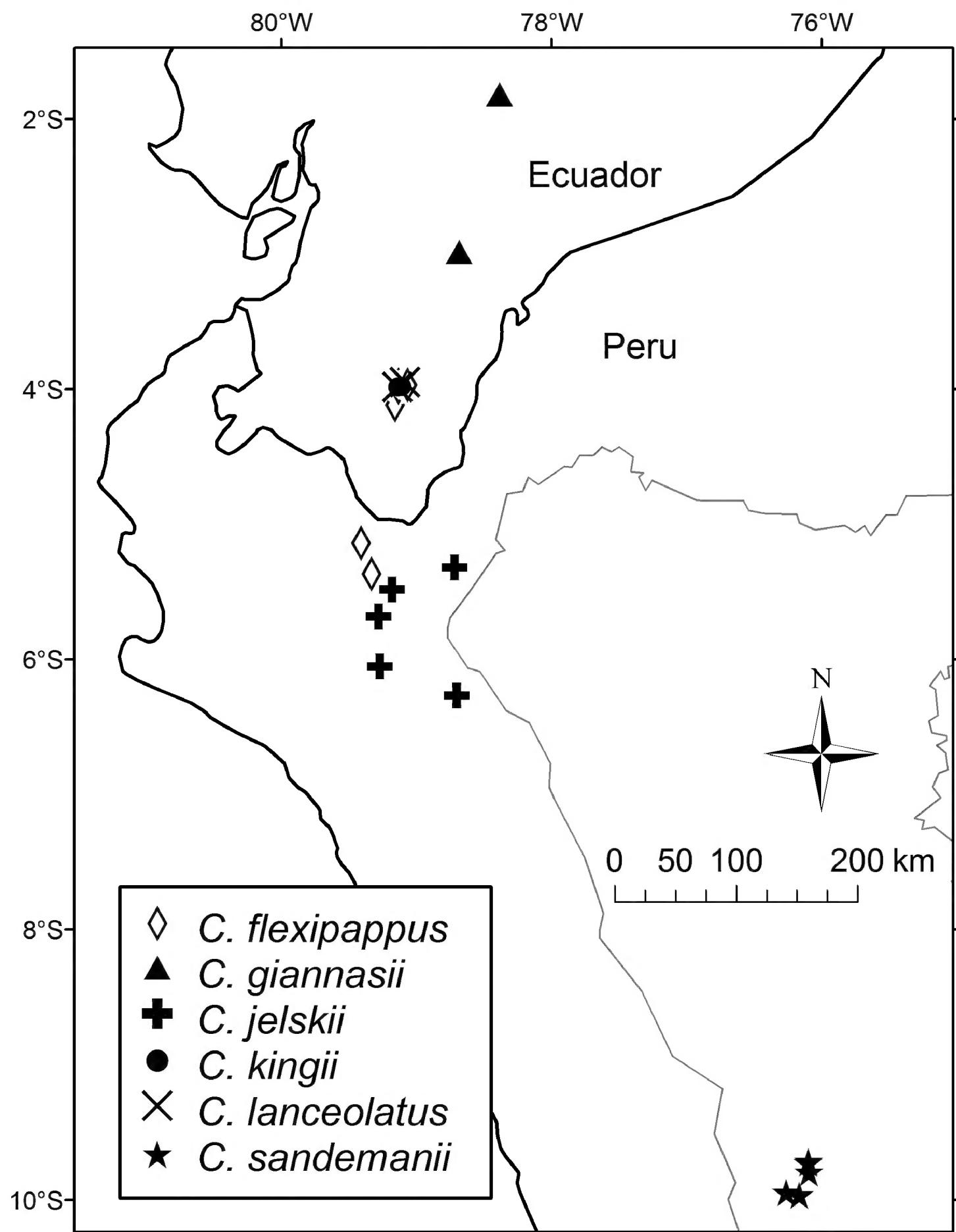


Figure 10. Distribution map of *Cuatrecasanthus* species.

6. *Cuatrecasanthus sandemanii* (H. Rob. & B. Kahn) H. Rob., Revista Colomb. Ci. Exact. 17 (65): 210 (1989).
http://species-id.net/wiki/Cuatrecasanthus_sandemanii
 Figs 8B, 10

Type: Based on *Vernonia sandemanii* H. Rob. & B. Kahn
Vernonia sandemanii H. Rob. & B. Kahn, Phytologia 58(4): 253 (1985).

Type: Peru. Huánuco: Carpish (above Huánuco) [09°56'47"S, 76°15'51"W, estimated], 8500 ft [2600 m], June 1938, C. Sandeman 219 (holotype: BM!; isotype: K).

Description. Shrubs to small trees, to 3.3 m high; stems brownish, flexuous above, terete, irregularly appressed pilosulous with short pale trichomes. Leaves with petioles mostly 1–3 mm long; blades thinly papyraceous (the only species), elliptical, broadest near middle, mostly 7–9 cm long, 1.5–2.7 cm wide, base cuneate, apex narrowly acute to short acuminate, margins narrowly recurved, less recurved at apex, margins becoming shortly serrate distally with few inrolled teeth, adaxial surface dark green, rather shiny, sparsely pilosulous, more densely pilosulous on major veins, primary, secondary and tertiary veins insculpate, abaxial surface whitish, pale sericeous on veins, between major veins whitish tomentellous with prostrate myceliiform branching trichomes; secondary veins ascending with 5–9 pairs. Inflorescence distinctly exceeding the reduced distal leaves, main axis and branches somewhat deflected at nodes, larger foliiform bracts restricted to primary nodes; branches densely yellowish sericeous. Heads sessile in clusters of 2–6 and clusters congested in numerous larger dense glomerules, 10–12 mm high × 1.5–2.0 mm wide; involucres cylindrical or fusiform; involucral bracts greenish brown with exposed parts purplish, ca. 15 in 4–5 series, 1.5–5.0 mm long, ca. 1 mm wide, outer bracts ovate, glabrous to subtomentellous outside, apices rounded to short-obtuse, becoming frayed, linear to narrowly elliptical, mostly glabrous, distally slightly appressed puberulous, short-acute, darkened at tips. Florets with corollas violet, ca. 8 mm long, with numerous glandular dots outside, denser on tube and few on tips of lobes, tube 3.5–4.0 mm long, lobes 3.5–4.0 mm long, ca. 0.7 mm wide; anther thecae dark reddish brown, ca. 1.3 mm long, bases papillose-fringed; apical appendage oblong, apex rounded. Achenes ca. 2 mm long, costae shortly setuliferous, between costae glandular punctate; pappus white, of ca. 65 capillary bristles ca. 7 mm long, slightly broadened at tips. Pollen grains ca. 45 µm in diam. in fluid.

Additional specimens examined. Peru. Huánuco: Prov. Huánuco, alturas de Carpish, entre Huánuco y Tingo María [09°43'11"S, 76°05'56"W, estimated], 2800 m, February 1940, Ridoutt s.n. (USM #11579, US); Carpish, entre Huánuco y Tingo María [09°47'56"S, 76°05'47"W, estimated], 2800–2900 m, 22 August 1946, Ferreyra 1214 (USM, US), 9 August 1947, Ferreyra 2347 (US); Alrededor del Tunel de Carpish, 09°43'37"S, 76°06'07"W, 2800 m, 2 November 2001, Salina 230 (US); Prov. Huánuco, Munic. Dist. Amarilis, Sariapampa [9°58'S, 76°10'W, estimated from elevation], 3100 m, 7 May 1946, Woytkowski 34295 (F, MO).

Habitat: Near the road in cloud forest and rain forest in semi-shade; 2800–3100 m in elevation (Fig. 10).

Preliminary conservation status. Data Deficient

Acknowledgements

Maria Backlund and the staff of S and Mike Dillon and the staff of F are thanked for the loans of material, including the type specimen of *Vernonia giannasii* (from S). In addition, the staff at NY and BM kindly sent images of their types for use in Figure 9. All herbaria abbreviations are from Thiers (continuously updated). We thank Sara Alexander for making the map, Alice Tangerini for the original artwork, and the editors for their suggestions and corrections.

References

Chaudhri MN, Vegter IH, DeWal CM (1972) Index Herbariorum part II(3), Collectors I-L. *Regnum Vegetabile* 86: 1–473.

Gleason HA (1925) Studies on the flora of northern South America—V. Miscellaneous new or noteworthy species. *Bulletin of the Torrey Botanical Club* 52(5): 181–196. doi: 10.2307/2479939

Hieronymus G [HEW] (1905) Plantae peruviana a claro Constantino de Jelski collectae, Compositae. *Botanische Jahrbücher für Systematik, Pflanzengeschichte und Pflanzengeographie* 36(5): 458–573.

Keeley SC, Forsman ZH, Chan R (2007) A phylogeny of the “evil tribe” (Vernonieae: Compositae) reveals Old/New World long distance dispersal: Support from separate and combined congruent datasets (*trnL*1, *ndhF*, ITS). *Molecular Phylogenetics and Evolution* 44(1): 89–103. doi: 10.1016/j.ympev.2006.12.024

Robinson H (1989) Two new genera of Vernonieae (Asteraceae) from the northern Andes with dissected corolla limbs *Cuatrecasanthus* and *Joseanthus*. *Revista de la Academia Colombiana de Ciencias exactas, Fisicas y Naturales* 17(65): 207–213.

Robinson H, Kahn B (1985) New species of *Vernonia* from Bolivia and Peru (Vernonieae: Asteraceae). *Phytologia* 58(4): 252–257.

Stutts JG (1980) A new species of *Vernonia* (Compositae) from Ecuador. *Brittonia* 32(2): 162–163. doi: 10.2307/2806782

Thiers B (continuously updated) Index Herbariorum: A global directory of public herbaria and associated staff. New York Botanical Garden’s Virtual Herbarium. <http://sweetgum.nybg.org/ih/>